

Definition:

It is a fracture of femoral diaphysis occurring between 5 cm distal to lesser trochanter and 5 cm proximal to adductor tubercle

Anatomy:

-Femur is the largest tubal bone -Surrounded by large muscle mass

-Thigh Muscles:

1-Ant. Compartment: Quadriceps (rectus femoris, vastus lateralis, vastus intermedius, vastus medialis)

2-Medial Compartment: Gracilis - Adductor longus - Adductor brevis - Adductor magnus - Sartorius

3-Posterior Compartment: Biceps femoris - Semitendinosus - Semimembranous

**Compartment syndrome is uncommon in thigh because of large-volume that the thigh requires to cause a pathological increase in interstitial pressure.

-Pattern of Displacement:

1-Proximal shaft fractures: the proximal fragment is flexed, abducted and externally rotated because of gluteus medius and iliopsoas pull; the distal fragment is frequently adducted.

2-Mid-shaft fractures: the proximal fragment is again flexed and externally rotated but abduction is less marked.

3-Lower third fractures: the proximal fragment is adducted and the distal fragment is tilted by gastrocnemius pull.

Mechanism of injury:

-Almost always due to high energy trauma (e.g. Gun shot, fall from height, motor car accident)

-Fractures in elderly patients should be considered 'pathological' until proved otherwise.

Clinical Features:

-Pain -Swelling -Deformity -LL Shortening & Complete external rotation deformity

-Severe blood loss (up to 1500 mL)

-Shock features: (unconscious - pallor - coldness - Tachycardia - Hypotension - Cool clammy skin)

-Deformities: •Proximal $\frac{2}{3}$ → Proximal fragment abducted, flexed & Externally Rotated

•Distal $\frac{1}{3}$ → Hyperextension of distal fragment

Physical Examination: (after Resuscitation)

-Complete head, chest & other skeletal segments -Distal nervous & vascular exam. -Palpate all bones

*1st aid principles: Splint or traction esp. prior to transfer to another institution

Radiology: -AP & Lat views of femur, hip & knee -AP view of pelvis

*Fracture pattern, comminution, shortening should be evaluated

Classification:

-NO generally accepted system

**Winquist's classification: (Acc. to degree of soft-tissue damage and fracture instability)

Type 1	No comminution at fracture site
Type 2	Butterfly fragment but still at least 50% cortical contact between main fragments
Type 3	Butterfly fragment involves more than 50% of the bone width
Type 4	All cortical contact is lost

Management:

A) Emergency:

1-Cross & Type for at least 2 units PRBC (Packed red blood cells)

2-Assess & Treat neurovascular status 3-Immobilize without traction 4-Analgesics

B) Decision Making:

***According to: (Age - Mechanism of injury - Fracture pattern & Location - Associated injuries)**

1-Adult:

-Mid-shaft: Intramedullary nailing through an anterograde or retrograde insertion site

Advantages of Intramedullary nail:

1-More stable & less exposure 2-Maintain hematoma 3-Easy use of limb

4-Length restoration 5-Rapid union

-Proximal / Distal $\frac{1}{3}$: may plate or intramedullary nail depending on location & morphology

Indications of Plate:

1-Previous mal-union 2-Extend to trochanter or condyle 3-Comminuted fracture

-External Fixator: in the case of

•Multiple injury patient •Complex distal femoral fracture •Dirty open # •Vascular injury

2-Pediatric:

• 0 : 5 years: Early 90-90 spica casting (The hip and knee were flexed to 90 degrees)

• 5 : 11 years: Skin Traction for 2 wks, then hip spica

****Accepted Angulation in children < 11 years:**

-Coronal → Up to 15° -Sagittal → Up to 20° -Rotation → Up to 30°

• Others: Ext. Fixator (Portable traction) – Plate – Flexible Nailing

Complications of Femoral Shaft Fracture:

A) Early: Shock - Fat embolism - sciatic nerve injury - Femoral artery injury - Infections

B) Late: Delayed union - Nonunion - Hardware failure

